```
=> d his nofil

     (FILE 'HOME' ENTERED AT 09:39:26 ON 17 JUL 2006)

     FILE 'REGISTRY' ENTERED AT 09:39:34 ON 17 JUL 2006
L1             STR
L2           0 SEA SSS SAM L1
L3           1 SEA SSS FUL L1
               D SCA
L4             STR L1
L5          10 SEA SSS SAM L4
               D SCA
L6        2955 SEA SSS FUL L4
L7          96 SEA ABB=ON  PLU=ON  L6 NOT FULLER?

     FILE 'HCAPLUS' ENTERED AT 09:42:57 ON 17 JUL 2006
L8           1 SEA ABB=ON  PLU=ON  L3
               E US2003-618586/APPS
L9           1 SEA ABB=ON  PLU=ON  US2003-618586/AP
L10          1 SEA ABB=ON  PLU=ON  L8 OR L9
               SEL RN

     FILE 'REGISTRY' ENTERED AT 09:43:24 ON 17 JUL 2006
L11         14 SEA ABB=ON  PLU=ON  (139-13-9/BI OR 142-73-4/BI OR 1468-95-7/BI
                OR 207408-91-1/BI OR 249618-52-8/BI OR 249618-53-9/BI OR
               249618-54-0/BI OR 249618-55-1/BI OR 35013-72-0/BI OR 541-09-3/B
               I OR 7440-02-0/BI OR 7440-44-0/BI OR 7440-50-8/BI OR 9013-20-1/
               BI)
               D SCA
L12      481963 SEA ABB=ON  PLU=ON  CU/ELS
L13      498788 SEA ABB=ON  PLU=ON  NI/ELS
L*** DEL     96 S L7

     FILE 'HCAPLUS' ENTERED AT 09:44:50 ON 17 JUL 2006
L14         28 SEA ABB=ON  PLU=ON  L7

     FILE 'HCAPLUS' ENTERED AT 09:45:00 ON 17 JUL 2006
L*** DEL        TRA L14 1-28 RN :      374 TERMS
L*** DEL1334700 SEA L15

     FILE 'REGISTRY' ENTERED AT 09:45:44 ON 17 JUL 2006

     FILE 'HCAPLUS' ENTERED AT 09:45:50 ON 17 JUL 2006
L15            TRA PLU=ON  L14 1-28 RN :     374 TERMS

     FILE 'REGISTRY' ENTERED AT 09:45:51 ON 17 JUL 2006
L16        374 SEA ABB=ON  PLU=ON  L15
L17          3 SEA ABB=ON  PLU=ON  L16 AND (CU OR NI)/ELS
               D SCA

     FILE 'HCAPLUS' ENTERED AT 09:46:14 ON 17 JUL 2006
L18          2 SEA ABB=ON  PLU=ON  L17 AND L14
L19        783 SEA ABB=ON  PLU=ON  L6
               E NANOTUB/CT
               E E6+ALL
L20      26345 SEA ABB=ON  PLU=ON  NANOTUBES+PFT,NT/CT
               E NANOFIBERS/CT
               E E3+ALL
L21       8319 SEA ABB=ON  PLU=ON  NANOFIBERS+PFT,NT/CT
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Considered 07/18/06 MEC

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L22          40 SEA ABB=ON  PLU=ON  L19 AND (L20 OR L21)

     FILE 'REGISTRY' ENTERED AT 09:48:26 ON 17 JUL 2006

     FILE 'HCAPLUS' ENTERED AT 09:48:32 ON 17 JUL 2006
L23             TRA PLU=ON  L22 1-40 RN :     203 TERMS

     FILE 'REGISTRY' ENTERED AT 09:48:33 ON 17 JUL 2006
L24         203 SEA ABB=ON  PLU=ON  L23
L25           2 SEA ABB=ON  PLU=ON  L24 AND (CU OR NI)/ELS
                D SCA

     FILE 'HCAPLUS' ENTERED AT 09:48:51 ON 17 JUL 2006
L26           1 SEA ABB=ON  PLU=ON  L22 AND L25
                D SCA TI
L27           2 SEA ABB=ON  PLU=ON  L18 OR L26
L28          50 SEA ABB=ON  PLU=ON  L19 AND ((L20 OR L21) OR NANOTUB?)
L29          10 SEA ABB=ON  PLU=ON  L28 NOT L22
                SEL RN

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                -0/BI OR 139707-96-3/BI OR 142136-39-8/BI OR 242476-91-1/BI OR
                365521-93-3/BI OR 365521-97-7/BI OR 477935-76-5/BI OR 4984-82-1
                /BI OR 9003-70-7/BI OR 108-13-4/BI OR 110-00-9/BI OR 120-12-7/B
                I OR 133354-62-8/BI OR 133850-04-1/BI OR 133850-05-2/BI OR
                133947-15-6/BI OR 134004-42-5/BI OR 138015-77-7/BI OR 139707-95
                -2/BI OR 141-82-2/BI OR 143974-29-2/BI OR 145392-90-1/BI OR
                145392-91-2/BI OR 145573-24-6/BI OR 145809-03-6/BI OR 145809-19
                -4/BI OR 145809-20-7/BI OR 145954-04-7/BI OR 145990-38-1/BI OR
                16733-97-4/BI OR 175862-81-4/BI OR 322478-27-3/BI OR 331943-00-
                1/BI OR 497-20-1/BI OR 499138-09-9/BI OR 499138-11-3/BI OR
                499138-12-4/BI OR 499138-13-5/BI OR 499138-14-6/BI OR 499138-15
                -7/BI OR 499138-17-9/BI OR 499138-18-0/BI OR 499138-19-1/BI OR
                499138-20-4/BI OR 499138-21-5/BI OR 499138-22-6/BI OR 499138-23
                -7/BI OR 499138-24-8/BI OR 499138-26-0/BI OR 502-86-3/BI OR
                542-92-7/BI OR 7440-44-0/BI OR 7631-86-9/BI OR 849820-70-8/BI)
L31           0 SEA ABB=ON  PLU=ON  L30 AND (CU OR NI)/ELS

     FILE 'BEILSTEIN' ENTERED AT 09:51:33 ON 17 JUL 2006
L32           0 SEA SSS FUL L1
L33             STR L1

     FILE 'MARPAT' ENTERED AT 09:52:30 ON 17 JUL 2006
L34           0 SEA SSS SAM L33
L35           0 SEA SSS SAM L1
L36           2 SEA SSS FUL L1
L37           2 SEA ABB=ON  PLU=ON  L36 NOT L27
L38             STR
L39           0 SEA SUB=L36 SSS FUL L38

=> fil hcap
FILE 'HCAPLUS' ENTERED AT 09:54:34 ON 17 JUL 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2006 AMERICAN CHEMICAL SOCIETY (ACS)
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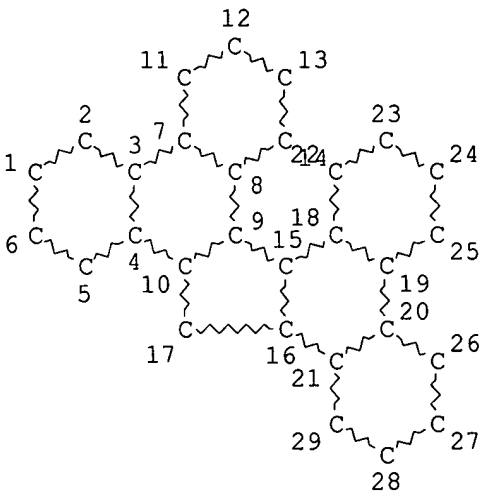
FILE COVERS 1907 - 17 Jul 2006 VOL 145 ISS 4
FILE LAST UPDATED: 16 Jul 2006 (20060716/ED)

New CAS Information Use Policies, enter HELP USAGETERMS for details.

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d que l27
L4 STR



NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 29

STEREO ATTRIBUTES: NONE

L6	2955	SEA FILE=REGISTRY SSS FUL L4	
L7	96	SEA FILE=REGISTRY ABB=ON PLU=ON	L6 NOT FULLER?
L14	28	SEA FILE=HCAPLUS ABB=ON PLU=ON	L7
L15		TRANSFER PLU=ON L14 1-28 RN :	374 TERMS
L16	374	SEA FILE=REGISTRY ABB=ON PLU=ON	L15
L17	3	SEA FILE=REGISTRY ABB=ON PLU=ON	L16 AND (CU OR NI)/ELS
L18	2	SEA FILE=HCAPLUS ABB=ON PLU=ON	L17 AND L14
L19	783	SEA FILE=HCAPLUS ABB=ON PLU=ON	L6
L20	26345	SEA FILE=HCAPLUS ABB=ON PLU=ON	NANOTUBES+PFT,NT/CT
L21	8319	SEA FILE=HCAPLUS ABB=ON PLU=ON	NANOFIBERS+PFT,NT/CT
L22	40	SEA FILE=HCAPLUS ABB=ON PLU=ON	L19 AND (L20 OR L21)

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L23             TRANSFER  PLU=ON  L22 1-40 RN :     203 TERMS
L24         203 SEA FILE=REGISTRY ABB=ON  PLU=ON  L23
L25           2 SEA FILE=REGISTRY ABB=ON  PLU=ON  L24 AND (CU OR NI)/ELS
L26           1 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L22 AND L25
L27           2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L18 OR L26
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=> d l27 ibib abs hitind hitstr 1-2

L27 ANSWER 1 OF 2 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:803370 HCAPLUS
DOCUMENT NUMBER: 138:13908
TITLE: Radical Cation and Dication of Fluorene Fully Annelated with Bicyclo[2.2.2]octene Units: Importance of the Quinoidal Resonance Structure in the Cationic Fluorene
AUTHOR(S): Nishinaga, Tohru; Inoue, Ryota; Matsuura, Akira; Komatsu, Koichi
CORPORATE SOURCE: Institute for Chemical Research, Kyoto University, Uji, Kyoto, 611-0011, Japan
SOURCE: Organic Letters (2002), 4(23), 4117-4120
CODEN: ORLEF7; ISSN: 1523-7060
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
OTHER SOURCE(S): CASREACT 138:13908
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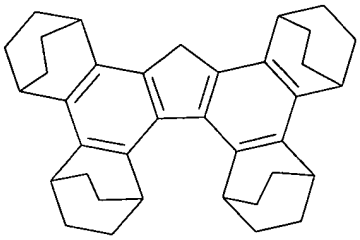

I

AB Fluorene I fully annelated with bicyclo[2.2.2]octene units was newly synthesized and oxidized to stable cationic species. The structure of radical cation salt I•+SbCl6- was determined by x-ray crystallog., while the first fluorene dication I2+ was characterized by 1H and 13C NMR at -80°. Combined with the results of theor. calcns., an important contribution of a quinoidal structure to the resonance hybrid was demonstrated in both I•+ and I2+.

CC 22-13 (Physical Organic Chemistry)
Section cross-reference(s): 24, 25, 72, 75, 76

IT **477782-32-4P**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(crystallog.; importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)

IT **477782-29-9**
RL: PRP (Properties)

(crystallog.; importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)

IT **7447-39-4**, Cupric chloride, uses
RL: CAT (Catalyst use); USES (Uses)
(importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)

IT 477788-68-4 **477788-76-4**
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)

IT **477782-30-2**
RL: FMU (Formation, unclassified); PRP (Properties); RCT (Reactant); FORM (Formation, nonpreparative); RACT (Reactant or reagent)
(importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)

IT **477782-31-3P**
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)

IT **477782-32-4P**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(crystallog.; importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)

RN 477782-32-4 HCAPLUS

CN Antimonate(1-), hexachloro-, (OC-6-11)-, salt with 2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17a-hexadecahydro-1,4:5,8:9,12:13,16-tetraethano-1H-cyclopenta[1,2-l:3,4-l']diphenanthrene, compd. with dichloromethane (1:1:1) (9CI) (CA INDEX NAME)

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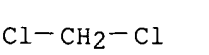
CRN 75-09-2
CMF C H2 Cl2

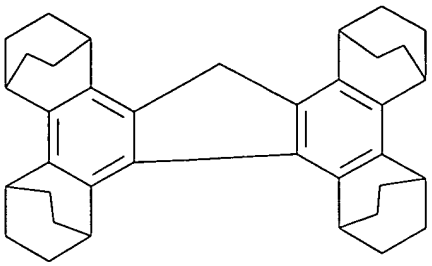


CM 2

CRN 477782-31-3
CMF C37 H42 . Cl6 Sb

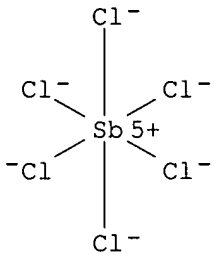
CM 3

CRN 477782-30-2
CMF C37 H42
CCI RIS

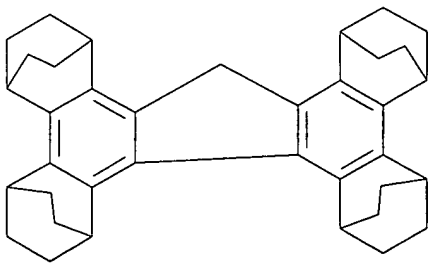


CM 4

CRN 17949-89-2
CMF Cl6 Sb
CCI CCS



IT **477782-29-9**
RL: PRP (Properties)
(crystallog.; importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)
RN 477782-29-9 HCAPLUS
CN 1,4:5,8:9,12:13,16-Tetraethano-1H-cyclopenta[1,2-l:3,4-l']diphenanthrene, 2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17-hexadecahydro- (9CI) (CA INDEX NAME)

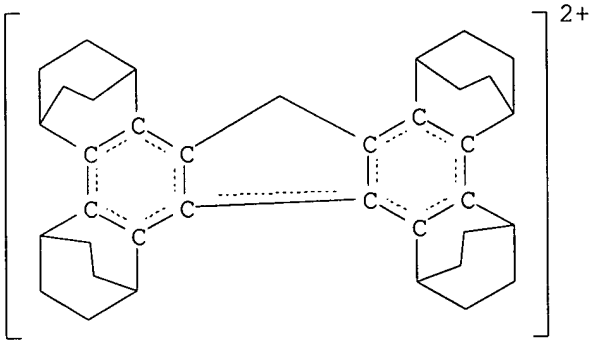


IT **7447-39-4**, Cupric chloride, uses
RL: CAT (Catalyst use); USES (Uses)
(importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with

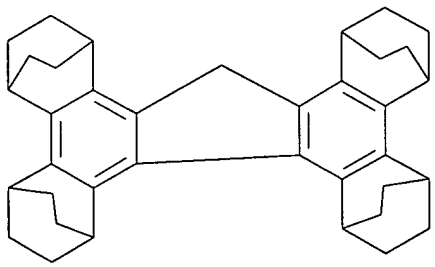
bicyclo[2.2.2]octene units)
RN 7447-39-4 HCAPLUS
CN Copper chloride (CuCl2) (8CI, 9CI) (CA INDEX NAME)

Cl—Cu—Cl

IT **477788-76-4**
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)
RN 477788-76-4 HCAPLUS
CN 1,4:5,8:9,12:13,16-Tetraethano-1H-cyclopenta[1,2-l:3,4-l']diphenanthrenediylium, 2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17-hexadecahydro- (9CI) (CA INDEX NAME)



IT **477782-30-2**
RL: FMU (Formation, unclassified); PRP (Properties); RCT (Reactant); FORM (Formation, nonpreparative); RACT (Reactant or reagent)
(importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)
RN 477782-30-2 HCAPLUS
CN 1,4:5,8:9,12:13,16-Tetraethano-1H-cyclopenta[1,2-l:3,4-l']diphenanthrene, 2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17-hexadecahydro-, radical ion(1+) (9CI) (CA INDEX NAME)



IT **477782-31-3P**

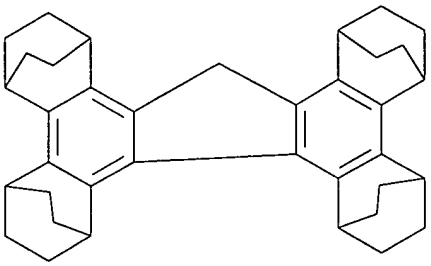
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(importance of quinoidal resonance structure in cationic fluorene and radical cation and dication of fluorene fully annelated with bicyclo[2.2.2]octene units)

RN 477782-31-3 HCAPLUS

CN Antimonate(1-), hexachloro-, (OC-6-11)-, salt with 2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17a-hexadecahydro-1,4:5,8:9,12:13,16-tetraethano-1H-cyclopenta[1,2-l:3,4-l']diphenanthrene (1:1) (9CI) (CA INDEX NAME)

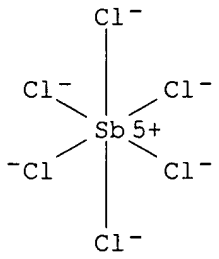
CM 1

CRN 477782-30-2
CMF C37 H42
CCI RIS



CM 2

CRN 17949-89-2
CMF Cl6 Sb
CCI CCS



REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L27 ANSWER 2 OF 2 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1999:723270 HCAPLUS
DOCUMENT NUMBER: 131:334353
TITLE: Method for immobilizing and/or crystallizing biological macromolecules on carbon nanotubes, and applications
INVENTOR(S): Balavoine, Fabrice; Mioskowski, Charles; Schultz, Patrick; Richard, Cyrille

PATENT ASSIGNEE(S): Commissariat a l'Energie Atomique, Fr.; Centre National de la Recherche Scientifique-CNRS
SOURCE: PCT Int. Appl., 32 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9957564	A1	19991111	WO 1999-FR1086	19990507
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
FR 2778846	A1	19991126	FR 1998-6539	19980525
FR 2778846	B1	20010511		
AU 9935292	A1	19991123	AU 1999-35292	19990507
EP 1078261	A1	20010228	EP 1999-917007	19990507
EP 1078261	B1	20041027		
R: DE, FR, GB, NL				
JP 2002513815	T2	20020514	JP 2000-547479	19990507
US 6656712	B1	20031202	US 2000-673668	20001201
US 2004018543	A1	20040129	US 2003-618586	20030715

this applicn

PRIORITY APPLN. INFO.:

EP 1998-401114	A	19980507
FR 1998-6539	A	19980525
WO 1999-FR1086	W	19990507
US 2000-673668	A3	20001201

AB The invention concerns the immobilization, and crystallization of biol. macromols.
via self assembly on carbon multiwall nanotubes (MWNT) by adding the macromols. to the solution that contains the closed end MWNT and incubating for 15 min without stirring or agitation at optimal conditions. Macromols. are soluble proteins, membrane and transmembrane proteins, enzymes, antibodies, antibody fragments, or nucleic acids. The carbon nanotubes are functionalized by the phys. adsorption of linkers that are of the general formula H-E-L. H represents a hydrophile group; with pos. or neg. charge; an analog of the biomol., a metal complex, e.g. Ni-NTA, Cu-IDA; the group contains a binding site to the spacer arm E. E spacer arm is a C1-C10 mol.; the chain can contain a phosphate group; the end group can be N, O, S containing L is a lipid with multiple chains, C12-C20 saturated or non-saturated; five or six member aromatic ring with substituents. The
synthesis of a biotinylated ethoxy-anthracene-acetamide linker is described. The immobilized biomols. are used for structure studies, as receptors and bioconductors for biosensors.

IC ICM G01N033-543
ICS G01N033-547; C12N011-06; C07C235-20; C07D495-04; C07C233-40; C07F001-00; C07F015-04
CC 9-16 (Biochemical Methods)
IT **Nanotubes**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)

(carbon; method for immobilizing and/or crystallizing biol. macromols. on carbon nanotubes, and applications)

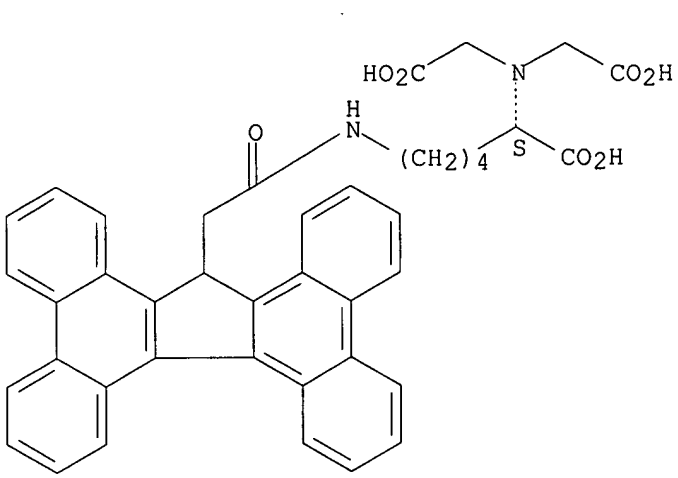
IT 249618-54-0P **249618-55-1P**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(method for immobilizing and/or crystallizing biol. macromols. on carbon nanotubes, and applications)

IT 139-13-9D, complex with nickel 142-73-4D, complex with copper 1468-95-7, 9-Anthracenemethanol **7440-02-0D**, Nickel, complex with NTA, reactions **7440-50-8D**, Copper, complex with IDA, reactions 35013-72-0
RL: RCT (Reactant); RACT (Reactant or reagent)
(method for immobilizing and/or crystallizing biol. macromols. on carbon nanotubes, and applications)

IT **249618-55-1P**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(method for immobilizing and/or crystallizing biol. macromols. on carbon nanotubes, and applications)

RN 249618-55-1 HCAPLUS
CN L-Lysine, N2,N2-bis(carboxymethyl)-N6-(17H-cyclopenta[1,2-l:3,4-l']diphenanthren-17-ylacetyl)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



IT **7440-02-0D**, Nickel, complex with NTA, reactions **7440-50-8D**, Copper, complex with IDA, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(method for immobilizing and/or crystallizing biol. macromols. on carbon nanotubes, and applications)

RN 7440-02-0 HCAPLUS
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-50-8 HCAPLUS
CN Copper (7CI, 8CI, 9CI) (CA INDEX NAME)

Cu

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> fil marpat
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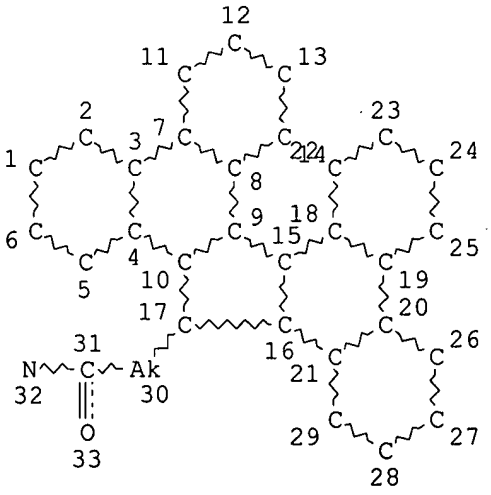
MOST RECENT CITATIONS FOR PATENTS FROM MAJOR ISSUING AGENCIES
(COVERAGE TO THESE DATES IS NOT COMPLETE):

US 2006118302 08 JUN 2006
DE 102004053653 04 MAY 2006
EP 1653548 03 MAY 2006
JP 2006112980 27 APR 2006
WO 2006053912 26 MAY 2006
GB 2419594 03 MAY 2006
FR 2877004 28 APR 2006
RU 2275374 27 APR 2006
CA 2518664 10 MAR 2006

Expanded G-group definition display now available.

New CAS Information Use Policies, enter HELP USAGETERMS for details.

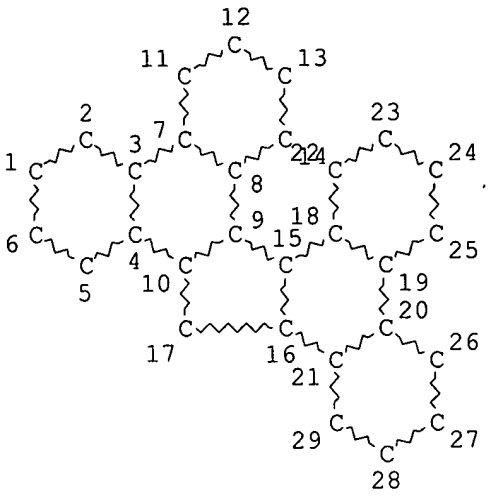
=> d que l37
L1 STR



NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 33

STEREO ATTRIBUTES: NONE
L4 STR



NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 29

STEREO ATTRIBUTES: NONE

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L7	96	SEA FILE=REGISTRY ABB=ON PLU=ON L6 NOT FULLER?
L14	28	SEA FILE=HCAPLUS ABB=ON PLU=ON L7
L15		TRANSFER PLU=ON L14 1-28 RN : 374 TERMS
L16	374	SEA FILE=REGISTRY ABB=ON PLU=ON L15
L17	3	SEA FILE=REGISTRY ABB=ON PLU=ON L16 AND (CU OR NI)/ELS
L18	2	SEA FILE=HCAPLUS ABB=ON PLU=ON L17 AND L14
L19	783	SEA FILE=HCAPLUS ABB=ON PLU=ON L6
L20	26345	SEA FILE=HCAPLUS ABB=ON PLU=ON NANOTUBES+PFT,NT/CT
L21	8319	SEA FILE=HCAPLUS ABB=ON PLU=ON NANOFIBERS+PFT,NT/CT
L22	40	SEA FILE=HCAPLUS ABB=ON PLU=ON L19 AND (L20 OR L21)
L23		TRANSFER PLU=ON L22 1-40 RN : 203 TERMS
L24	203	SEA FILE=REGISTRY ABB=ON PLU=ON L23
L25	2	SEA FILE=REGISTRY ABB=ON PLU=ON L24 AND (CU OR NI)/ELS
L26	1	SEA FILE=HCAPLUS ABB=ON PLU=ON L22 AND L25
L27	2	SEA FILE=HCAPLUS ABB=ON PLU=ON L18 OR L26
L36	2	SEA FILE=MARPAT SSS FUL L1
L37	2	SEA FILE=MARPAT ABB=ON PLU=ON L36 NOT L27

=> d l37 ibib abs qhit 1-2

L37 ANSWER 1 OF 2 MARPAT COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 133:89075 MARPAT

TITLE: Rapid purification by polyaromatic quench reagents
INVENTOR(S): Da Silva, Marianne; Downing, Dennis Michael; Warmus, Joseph Scott; Zhang, Lu-yan
PATENT ASSIGNEE(S): Warner-Lambert Co., USA
SOURCE: PCT Int. Appl., 92 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000039055	A1	20000706	WO 1999-US30470	19991221

W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CR, CU, CZ, DM, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MA, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

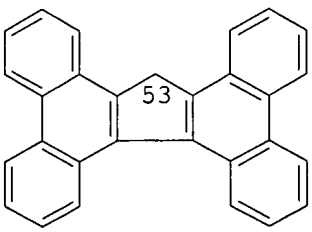
PRIORITY APPLN. INFO.: US 1998-113435P 19981223
US 1999-162782P 19991101

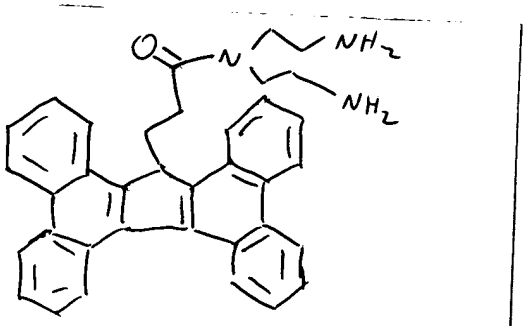
AB PLQ (I; P = polyarom. hydrocarbon of low chemical reactivity which is soluble; Q = ≥1 quenching reagents, or an acid or base addition salt thereof, that are capable of selective covalent reaction with unwanted byproducts, or excess reagents; L = ≥1 chemical robust linkers or dendritic linkers that join P and Q) were prepared and their use in rapid purification of synthetic intermediates and products in organic synthesis was demonstrated. Thus, I in which Q = NH2 was used to quench an isocyanate amidation and the covalently modified I was removed by charcoal.

MSTR 1

G1—G2

G1 = 53





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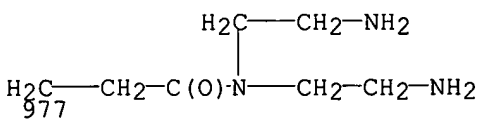


Patent location: claim 1

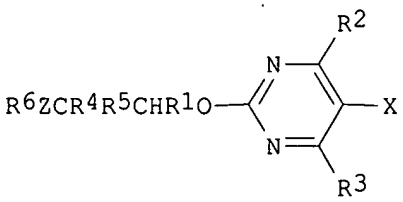
REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 2 OF 2 MARPAT COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 131:165311 MARPAT
TITLE: New carboxylic acid derivatives with 5-substituted pyrimidine ring, their preparation and use as endothelin receptor antagonists
INVENTOR(S): Amberg, Wilhelm; Jansen, Rolf; Kling, Andreas; Klinge, Dagmar; Riechers, Hartmut; Hergenroeder, Stefan; Raschack, Manfred; Unger, Liliane
PATENT ASSIGNEE(S): BASF A.-G., Germany
SOURCE: Ger. Offen., 20 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 19806438	A1	19990819	DE 1998-19806438	19980217
CA 2321182	AA	19990826	CA 1999-2321182	19990205
WO 9942453	A1	19990826	WO 1999-EP776	19990205
W: AL, AU, BG, BR, BY, CA, CN, CZ, GE, HR, HU, ID, IL, IN, JP, KR, KZ, LT, LV, MK, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TR, UA, US, AM, AZ, KG, MD, TJ, TM				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
AU 9930271	A1	19990906	AU 1999-30271	19990205
BR 9907911	A	20001024	BR 1999-7911	19990205
TR 200002376	T2	20001221	TR 2000-20000237619990205	
EP 1066268	A1	20010110	EP 1999-911657	19990205
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, PT, IE, SI, FI, RO				
JP 2002503726	T2	20020205	JP 2000-532405	19990205
TW 579376	B	20040311	TW 1999-88102031	19990210
ZA 9901214	A	20000816	ZA 1999-1214	19990216
BG 104577	A	20010330	BG 2000-104577	20000704
NO 2000004075	A	20000815	NO 2000-4075	20000815
HR 2000000602	A1	20010630	HR 2000-602	20000913

PRIORITY APPLN. INFO.: DE 1998-19806438 19980217
WO 1999-EP776 19990205

GI

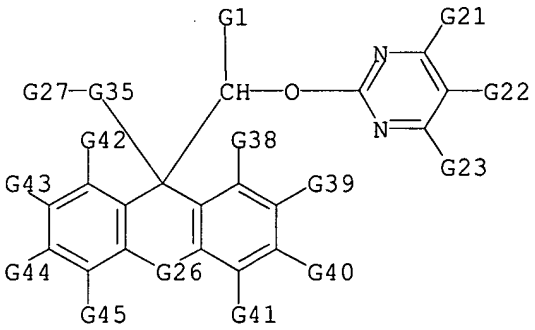


I

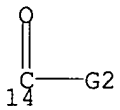
AB The title compds. [I; R1 = tetrazolyl, C(O)R; R = OR7, (substituted)

N-linked 5-membered heteroarom. residue, O(CH2)pS(:O)kR8, NHSO2R9; R7 = H, cation, (substituted) C3-8 cycloalkyl, (substituted) C1-8 alkyl, (substituted) Ph, (substituted) CH2Ph, C3-6 (halo)alkenyl, C3-6 (halo)alkynyl; R8, R9 = (substituted) C1-4 alkyl, (substituted) C3-8 cycloalkyl, (substituted) C3-6 alkenyl, (substituted) C3-6 alkynyl, (substituted) Ph; k = 0-2; p = 1-4; R2, R3 = H, OH, (substituted) amino, halo, alkyl, alkenyl, alkynyl, hydroxyalkyl, haloalkyl, alkoxy, etc.; R4, R5 = (substituted) Ph, (substituted) naphthyl, C3-7 cycloalkyl, etc.; R6 = H, (substituted) C1-8 alkyl, (substituted) C3-6 alkenyl, (substituted) C3-6 alkynyl, (substituted) C3-8 cycloalkyl, (substituted) Ph, (substituted) naphthyl, (substituted) 5- or 6-membered heteroarom. residue; X = halo, C1-4 haloalkyl, OH; Z = O, S, single bond], their enantiomers, diastereomers, and physiol. compatible salts are useful as endothelin receptor antagonists for treatment of diseases associated with elevated endothelin levels, such as chronic cardiac insufficiency, restenosis, hypertension, acute or chronic kidney failure, cerebral ischemia, asthma, benign prostate hyperplasia, and prostate cancer. Thus, Me 2-hydroxy-3-methoxy-3,3-diphenylpropionate reacted with NaH and 4,6-dimethoxy-5-fluoro-2-methylsulfonylpyrimidine in DMF to produce I (R1 = CO2Me, R2 = R3 = OMe, R4 = R5 = Ph, R6 = Me, X = F, Z = O), which was saponified to the corresponding acid (R1 = CO2H) (II). II bound to endothelin ETA and ETB receptors with Ki 7.4 and 1200 nM, resp.

MSTR 1D



G1 = 14



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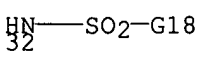
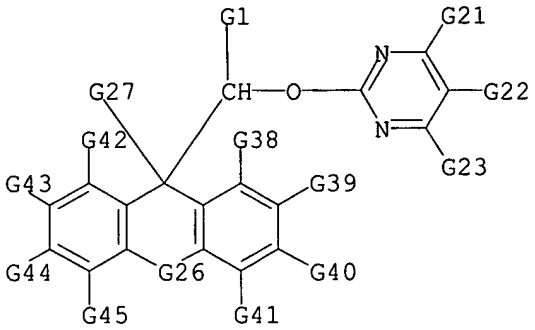


G26 = bond
G38+G39= CH=CHCH=CH
G40+G41= CH=CHCH=CH
G42+G43= CH=CHCH=CH
G44+G45= CH=CHCH=CH

Derivative:	and physiologically acceptable salts
Patent location:	claim 1
Note:	substitution is restricted
Note:	additional ring formation also claimed
Stereochemistry:	and enantiomeric and diastereomeric forms

MSTR 1E



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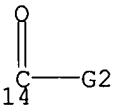
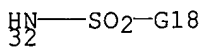


G2 = 32



G26 = bond
G38+G39= CH=CHCH=CH
G40+G41= CH=CHCH=CH
G42+G43= CH=CHCH=CH
G44+G45= CH=CHCH=CH

Derivative:	and physiologically acceptable salts
Patent location:	claim 1
Note:	substitution is restricted
Note:	additional ring formation also claimed
Stereochemistry:	and enantiomeric and diastereomeric forms

Considered 07/18/06 MEC

L8 ANSWER 1 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2006:398166 HCAPLUS
TITLE: Separation of Semiconducting from Metallic Carbon **Nanotubes** by Selective Functionalization with Azomethine Ylides
AUTHOR(S): Menard-Moyon, Cecilia; Izard, Nicolas; Doris, Eric; **Mioskowski, Charles**
CORPORATE SOURCE: Service de Marquage Moleculaire et de Chimie Bioorganique, DSV/DBJC, CEA/Saclay, Gif-sur-Yvette, 91191, Fr.
SOURCE: Journal of the American Chemical Society (2006), 128(20), 6552-6553
CODEN: JACSAT; ISSN: 0002-7863
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A mild and efficient method for the functionalization of SWNTs by cycloaddn. of azomethine ylides derived from trialkylamine-N-oxides is described. Selective reaction of semiconducting carbon **nanotubes** was achieved by preorganizing the starting N-oxides on the **nanotube** surface prior to generating the reactive ylides. Separation of met-SWNTs from functionalized sem-SWNTs was successfully accomplished by inducing solubilization of sem-SWNTs in the presence of lignoceric acid.
REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 2 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:1131651 HCAPLUS
DOCUMENT NUMBER: 144:428049
TITLE: Functionalizing carbon **nanotubes** for nanobiotechnologies
AUTHOR(S): Menard, Cecilia; Mackiewicz, Nicolas; Doris, Eric; **Mioskowski, Charles**
CORPORATE SOURCE: Sciences du vivant, CEA centre de Saclay, Fr.
SOURCE: Clefs CEA (2005), 52, 75-78
CODEN: CEACES; ISSN: 0298-6248
PUBLISHER: Commissariat a l'Energie Atomique
DOCUMENT TYPE: Journal; General Review
LANGUAGE: French
AB A review. The length of carbon **nanotubes** is characterized by micrometers; their diams. by nanometers. They have excellent mech., structural and elec. properties. Topics covered are: self assembly of detergent mols. in ring form around carbon **nanotubes**; use of **nanotubes** for drug targeting; self-assembly of proteins in the presence of **nanotubes**.

L8 ANSWER 3 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:77088 HCAPLUS
DOCUMENT NUMBER: 142:400141
TITLE: Combination of carbon **nanotubes** and two-photon absorbers for broadband optical limiting
AUTHOR(S): Izard, N.; Menard, C.; Riehl, D.; Doris, E.; **Mioskowski, C.**; Anglaret, E.
CORPORATE SOURCE: Centre Technique d'Arcueil, DGA, Arcueil, Fr.
SOURCE: Los Alamos National Laboratory, Preprint Archive, Condensed Matter (2005) 1-8, arXiv:cond-mat/0501422, 18 Jan 2005

CODEN: LNCMFR
URL: http://xxx.lanl.gov/pdf/cond-mat/0501422
PUBLISHER: Los Alamos National Laboratory
DOCUMENT TYPE: Preprint
LANGUAGE: English
AB New systems are required for optical limiting against broadband laser pulses. The authors demonstrate that the association of non-linear scattering from single-wall carbon **nanotubes** (SWNT) and multiphoton absorption (MPA) from organic chromophores is a promising approach to extend performances of optical limiters over broad spectral and temporal ranges. Such composites display high linear transmission and good neutral colorimetry and are particularly efficient in the nanosecond regime due to cumulative effects. Application to eye protection systems is indicated.
REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 4 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:847216 HCAPLUS
DOCUMENT NUMBER: 141:346146
TITLE: Preparation of self-assembled and photopolymerized lipid macromolecules around carbon **nanotubes** for the purification of **nanotubes** and for use as molecular vectors with hydrophobic molecules
INVENTOR(S): **Mioskowski, Charles**; Rickling, Stephane; **Schultz, Patrick**
PATENT ASSIGNEE(S): Centre National de la Recherche Scientifique CNRS, Fr.; Laboratoires GNR Pharma
SOURCE: Fr. Demande, 23 pp.
CODEN: FRXXBL
DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2853657	A1	20041015	FR 2003-4492	20030410
FR 2853657	B1	20050624		
CA 2521403	AA	20041028	CA 2004-2521403	20040413
WO 2004092231	A2	20041028	WO 2004-FR906	20040413
WO 2004092231	A3	20041118		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1611170	A2	20060104	EP 2004-742489	20040413
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR				

PRIORITY APPLN. INFO.: FR 2003-4492 A 20030410
WO 2004-FR906 W 20040413
AB The invention concerns the preparation of self-assembled polymerized lipid macromol. rings around carbon **nanotubes** that are composed of A

with one or two chains connected to a group Z; A is CH3-(CH2)m-C.tplbond.C-C.tplbond.C-(CH2)n -, n and m = 1 -16 identical or different; Z is a polar head group, selected from -COOH, - CO-NH-Y, -NH2 or N+(R)3, R = C2-C4 alkyl; Y = H, -(CH2)4; -C (R1)-N(CH2-COOH)2, R1 = H or -COOH in the case when A represents only one lipidic chain; or a group of: (-O-CH2-CH2)2CH-O-CH2-COO-R2 or (-O-CH2)2CH-OR2, where R2 = -COOH, -CO-NH-Y1; Y1 = -(CH2)4-C(R3)-N(CH2-COOH)2, R3 = H or COOH; or Z or R2 are identical or different with polar hydrophilic groups,or neutral polysaccharide groups. Lipids, lipid amines are sonicated in the presence of surfactants with the **nanotubes**; surfactants are removed by dialysis and the lipids are exposed to polymerization in the buffer. When the process is used for the purification and/or controlled shortening of the carbon **nanotubes**, the polymer rings can be removed by size-exclusion chromatog., using an elec. field or by heating. The polymerized lipid ring-surrounded **nanotubes** can be used as vectors for hydrophobic mols. and membrane proteins; or as mol. carriers.

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 5 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:442644 HCAPLUS
DOCUMENT NUMBER: 141:147675
TITLE: Combination of carbon **nanotubes** and two-photon absorbers for broadband optical limiting
AUTHOR(S): Izard, N.; Menard, C.; Riehl, D.; Doris, E.; **Mioskowski, C.**; Anglaret, E.
CORPORATE SOURCE: Delegation Generale a l'Armement, Centre Technique d'Arcueil, Arcueil, 94114, Fr.
SOURCE: Chemical Physics Letters (2004), 391(1-3), 124-128 CODEN: CHPLBC; ISSN: 0009-2614
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB New systems are required for optical limiting against broadband laser pulses. We demonstrate that the association of non-linear scattering from single-wall carbon **nanotubes** (SWNT) and multiphoton absorption (MPA) from organic chromophores is a promising approach to extend performances of optical limiters over broad spectral and temporal ranges. Such composites display high linear transmission and good neutral colorimetry and are particularly efficient in the nanosecond regime due to cumulative effects.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 6 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2003:891030 HCAPLUS
DOCUMENT NUMBER: 141:164287
TITLE: Broadband optical limiting optimization by combination of carbon **nanotubes** and two-photon absorbing chromophores in liquids
AUTHOR(S): Riehl, Didier; Izard, Nicolas; Vivien, Laurent; Anglaret, Eric; Doris, Eric; Menard, Cecilia; **Mioskowski, Charles**; Porres, Laurent; Mongin, Olivier; Charlot, M.; Blanchard-Desce, Mireille; Anemian, Remi; Mulatier, Jean-Christophe; Barsu, Cyril; Andraud, Chantal
CORPORATE SOURCE: Delegation Generale pour l'Armement, Ctr. Technique d'Arcueil, Arcueil, Fr.
SOURCE: Proceedings of SPIE-The International Society for

Optical Engineering (2003), 5211(Nonlinear Optical Transmission and Multiphoton Processes in Organics), 124-134
CODEN: PSISDG; ISSN: 0277-786X
PUBLISHER: SPIE-The International Society for Optical Engineering
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Nowadays, it seems evident that a unique nonlinear optical (NLO)material cannot offer simultaneously linear transparency,color neutrality and broadband optical limiting efficiency at the performance levels required for sensor and eye protection against all laser threats. Several combinations of NLO materials were studied last few years, including multicell or multilayer geometries. The approach presented here combines multiphoton absorption with nonlinear scattering. For that purpose, single-wall C **nanotubes** are suspended in various solns. of multiphoton absorbing chromophores. Such combinations allow the authors to obtain optical limiters of high linear transmittance and excellent color neutrality. Broadband optical limiting is expected from the association of these two broadband materials,and enhanced optical limiting efficiency is expected from cumulative effects in the nanosecond regime. The authors report here on the optical limiting studies performed with nanosecond laser pulses on several families of multiphoton absorbers in CHCl3, with C **nanotubes** suspended in the solns. The performances of these samples are compared with those of simple multiphoton absorber solns. and C **nanotube** suspensions, and the differences observed are interpreted in terms of cumulative NLO effects and adverse aggregation phenomenon. Ways to optimize stability of the suspensions are also experimented and discussed.

REFERENCE COUNT: 53 THERE ARE 53 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 7 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2003:330751 HCAPLUS
DOCUMENT NUMBER: 139:175523
TITLE: Supramolecular Self-Assembly of Lipid Derivatives on Carbon **Nanotubes**
AUTHOR(S): **Richard, Cyrille; Balavoine, Fabrice ; Schultz, Patrick;** Ebbesen, Thomas W.; **Mioskowski, Charles**
CORPORATE SOURCE: Service de Marquage Moleculaire et de Chimie Bioorganique, CEA-Saclay, Gif-sur-Yvette, 91191, Fr.
SOURCE: Science (Washington, DC, United States) (2003), 300(5620), 775-778
CODEN: SCIEAS; ISSN: 0036-8075
PUBLISHER: American Association for the Advancement of Science
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Images of the assembly of surfactants and synthetic lipids on the surface of carbon **nanotubes** were obtained by TEM. Above the critical micellar concentration, SDS forms supramol. structures made of rolled-up half-cylinders on the **nanotube** surface. Depending on the symmetry and the diameter of the carbon **nanotube**, we observed rings, helixes, or double helixes. Similar self-assemblies were also obtained with several synthetic single-chain lipids designed for the immobilization of histidine-tagged proteins. At the **nanotube**-water interface, permanent assemblies were produced from mixed micelles of SDS and different water-insol. double-chain lipids after dialysis of the surfactant. Such arrangements could be further exploited for the development of new biosensors and bioelectronic nanomaterials.

REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 8 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2002:815415 HCAPLUS
DOCUMENT NUMBER: 138:34974
TITLE: Two-Dimensional Crystallization of a Histidine-Tagged Protein on Monolayers of Fluidity-Enhanced Ni2+-Chelating Lipids
AUTHOR(S): Courty, Sebastien; Lebeau, Luc; Martel, Laurence; Lenne, Pierre-Francois; **Balavoine, Fabrice**; Dischert, Wanda; Konovalov, Oleg; **Mioskowski, Charles**; Legrand, Jean-Francois; Venien-Bryan, Catherine
CORPORATE SOURCE: Institut de Biologie Structurale Jean-Pierre Ebel (CEA-CNRS), Grenoble, 38027, Fr.
SOURCE: Langmuir (2002), 18(24), 9502-9512
CODEN: LANGD5; ISSN: 0743-7463
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Protein two-dimensional (2D) crystallization on lipid monolayers is a powerful method for structure determination This method has been extended using the specific and strong interaction between histidine residues (of an overexpressed protein) and Ni2+ ions tethered at the headgroup of synthetic lipids. Understanding and then improving the process of adsorption and crystallization of proteins on a lipid monolayer are prerequisites for the production of large and well-ordered crystals of any soluble or membrane His-tagged proteins. These large high-quality arrays are necessary for structural studies at high resolution We have investigated the steps of adsorption and 2D crystallization of His-HupR using three different lipids: (i) 2-(bis-carboxymethyl-amino)-6-[2-(1,3-di-O-oleyl-glyceroxy)-acetyl-amino] hexanoic acid nickel(II) (Ni-NTA-DOGA), which has been previously used, and two specifically designed Ni2+-chelating lipids, (ii) Ni-NTA-BB, which has two branched (B) alkyl chains and (iii) Ni-NTA-BF, a nonsym. lipid with one branched (B) and one fluorinated (F) chain. These three lipids, when spread at the air-water interface, exhibit various fluidity properties. The adsorption and crystallization process have been monitored in situ and in real time using a variety of complementary techniques such as ellipsometry, shear rigidity measurements of the monolayer, and Brewster angle microscopy, and we have also developed X-ray reflectivity anal. to investigate the evolution of the electron d. profile of the lipid-protein monolayer. Electron microscopy observations of the protein-lipid layers were also performed. We have found that the fluidity of the lipid monolayer has a marked influence on the rates of protein adsorption and crystallization of His-HupR. When Ni-NTA-BB is used to form the monolayer, it accelerates the process of protein adsorption and the protein crystallization is three times faster than when Ni-NTA-DOGA is used.
REFERENCE COUNT: 37 THERE ARE 37 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 9 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1999:764288 HCAPLUS
DOCUMENT NUMBER: 132:20801
TITLE: The preparation of molecular rods and their application for the fixation and crystallization of

biomolecules

INVENTOR(S): **Balavoine, Fabrice; Mioskowski, Charles; Schultz, Patrick**

PATENT ASSIGNEE(S): Commissariat A L'Energie Atomique, Fr.; Centre National De La Recherche Scientifique-CNRS

SOURCE: PCT Int. Appl., 47 pp.
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
WO 9961912	A1	19991202	WO 1999-FR1207		19990521
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM					
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG					
FR 2778918	A1	19991126	FR 1998-6540		19980525
FR 2778918	B1	20000721			
EP 1080368	A1	20010307	EP 1999-920903		19990521
EP 1080368	B1	20050504			
R: DE, FR, GB, NL					
JP 2002516914	T2	20020611	JP 2000-551258		19990521
AU 9938307	A1	19991213	AU 1999-38307		19990526
US 6403705	B1	20020611	US 2001-701192		20010206
PRIORITY APPLN. INFO.:			FR 1998-6540	A	19980525
			WO 1999-FR1207	W	19990521

AB The invention concerns mol. rods, their uses in a method for fixing and/or crystallizing macromols., the resulting products and uses of said products in the field of materials and structural biol., in particular as biosensors or as biomaterials. Said mol. rods have a structure represented by the general formula GF-(P-Ep)n, where P = polyphenyl, polyphenylene vinyl, polystyrene, polyvinyl and their derivs.; the GF functional group represents the a B-R type group, B being the arm or the linker group, and is a C1-C10 saturated chain with alkyl substituents, or a polyoxyethylene, or a phosphate group containing chain, that contain functional groups at their ends, e.g. O, NHCO, OCO, COO, CONH, S, CH2, NH; R = a hydrophile group, with pos. or neg. charge, or an organometal complex that interacts with amino acids and nucleic acids and the ligands can bind to the alkyl groups of the spacer E; n = 5-1000, p = 0-10; the spacer E = phenylene, ethylene, vinyl, and their derivs. containing alkyl, OH, O-alkyl NH2 etc. substituents, the spacer E does not interfere with the rigidity of the P rod part. The method consists in incubating, for 15 min-48 h, a biol. macromol. in solution with a mol. rod at room temperature, and pH 5.5-8.5 in an aqueous solution that can contain detergents. The biol. macromols. are bound to the mol. rods by non-covalent forces; the crystal formation is achieved via self-assembly. The method can be used for microscopic and crystallog. studies of proteins and nucleic acids. Thus nickel-NTA derivatized mol. rod was synthesized and used for the fixation of the RNA polymerase histidine-tagged ABC23 subunit; the process was performed at pH 8. After 18 h the nickel-NTA chelated His-tagged fragment was isolated by gel filtration and observed with

electron microscope.
REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 10 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1999:736165 HCAPLUS
DOCUMENT NUMBER: 132:78607
TITLE: Highly regioselective palladium-catalyzed condensation of terminal acetylenes with 2,5-diiodobenzoic acid
AUTHOR(S): **Balavoine, Fabrice**; Madec, David; **Mioskowski, Charles**
CORPORATE SOURCE: Service des Molecules Marquees CEA Saclay-DSV/DBCM, Gif sur Yvette, F-91191, Fr.
SOURCE: Tetrahedron Letters (1999), 40(48), 8351-8354
CODEN: TELEAY; ISSN: 0040-4039
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
OTHER SOURCE(S): CASREACT 132:78607
AB Pd-catalyzed coupling reactions between terminal alkynes and 2,5-diiodobenzoic acid are highly regioselective, giving a rapid and efficient route for the synthesis of disym. 2,5-diethynylbenzoic acid derivs.
REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 11 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1999:723270 HCAPLUS
DOCUMENT NUMBER: 131:334353
TITLE: Method for immobilizing and/or crystallizing biological macromolecules on carbon **nanotubes**, and applications
INVENTOR(S): **Balavoine, Fabrice; Mioskowski, Charles; Schultz, Patrick; Richard, Cyrille**
PATENT ASSIGNEE(S): Commissariat a l'Energie Atomique, Fr.; Centre National de la Recherche Scientifique-CNRS
SOURCE: PCT Int. Appl., 32 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9957564	A1	19991111	WO 1999-FR1086	19990507
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
FR 2778846	A1	19991126	FR 1998-6539	19980525
FR 2778846	B1	20010511		
AU 9935292	A1	19991123	AU 1999-35292	19990507

EP 1078261	A1	20010228	EP 1999-917007	19990507
EP 1078261	B1	20041027		
R: DE, FR, GB, NL				
JP 2002513815	T2	20020514	JP 2000-547479	19990507
US 6656712	B1	20031202	US 2000-673668	20001201
US 2004018543	A1	20040129	US 2003-618586	20030715
PRIORITY APPLN. INFO.:			EP 1998-401114 A	19980507
			FR 1998-6539 A	19980525
			WO 1999-FR1086 W	19990507
			US 2000-673668 A3	20001201

AB The invention concerns the immobilization, and crystallization of biol. macromols.
via self assembly on carbon multiwall **nanotubes** (MWNT) by adding the macromols. to the solution that contains the closed end MWNT and incubating for 15 min without stirring or agitation at optimal conditions. Macromols. are soluble proteins, membrane and transmembrane proteins, enzymes, antibodies, antibody fragments, or nucleic acids. The carbon **nanotubes** are functionalized by the phys. adsorption of linkers that are of the general formula H-E-L. H represents a hydrophile group; with pos. or neg. charge; an analog of the biomol., a metal complex, e.g. Ni-NTA, Cu-IDA; the group contains a binding site to the spacer arm E. E spacer arm is a C1-C10 mol.; the chain can contain a phosphate group; the end group can be N, O, S containing L is a lipid with multiple chains, C12-C20 saturated or non-saturated; five or six member aromatic ring with substituents. The synthesis of a biotinylated ethoxy-anthracene-acetamide linker is described. The immobilized biomols. are used for structure studies, as receptors and bioconductors for biosensors.
REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 12 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1999:691364 HCAPLUS
DOCUMENT NUMBER: 132:104616
TITLE: Self-assembly of soluble proteins on functionalized lipid layers: a tentative correlation between the fluidity properties of the lipid film and protein ordering
AUTHOR(S): Lebeau, L.; Nuss, S.; **Schultz, P.**; Oudet, P.; **Mioskowski, C.**
CORPORATE SOURCE: Laboratoire de Synthese Bioorganique Associe au CNRS, Universite Louis Pasteur, Illkirch, Fr.
SOURCE: Chemistry and Physics of Lipids (1999), 103(1-2), 37-46
CODEN: CPLIA4; ISSN: 0009-3084
PUBLISHER: Elsevier Science Ireland Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB New series of amphiphilic structures are designed to exhibit various fluidity properties when spread at the air-water interface. The influence of the mol. structure of these lipids on the process of two-dimensional (2D) crystallization of the B subunit of DNA gyrase, a soluble protein, is investigated in terms of size of the crystals produced, protein ordering, and crystallization kinetics. Whereas no difference is observed concerning the mean
size of the protein 2D crystals obtained on the different lipid supports, the ultimate protein ordering observable by electron microscopy using the neg.-staining technique is more regularly attained with some of these new lipids. The most interesting point results from large discrepancies in crystallization kinetics as highly-ordered protein 2D crystals form within 6-24 h

depending on the lipid layer structure. Thus, these new lipids reveal of special interest when studying proteins that suffer from extended incubation time at 4° or higher temperature and lose their functionality.
REFERENCE COUNT: 39 THERE ARE 39 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 13 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1999:470213 HCAPLUS
DOCUMENT NUMBER: 131:254597
TITLE: Helical crystallization of proteins on carbon **nanotubes**: a first step towards the development of new biosensors
AUTHOR(S): **Balavoine, Fabrice; Schultz, Patrick ; Richard, Cyrille**; Mallouh, Veronique; Ebbesen, Thomas W.; **Mioskowski, Charles**
CORPORATE SOURCE: CEA Saclay-DSV/DBCM/SMM, Gif sur Yvette, 91191, Fr.
SOURCE: Angewandte Chemie, International Edition (1999), 38(13/14), 1912-1915
CODEN: ACIEF5; ISSN: 1433-7851
PUBLISHER: Wiley-VCH Verlag GmbH
DOCUMENT TYPE: Journal
LANGUAGE: English
AB To demonstrate the potential of carbon **nanotubes** in structural biol. and biotechnol., streptavidin and HupR, both are water soluble proteins, were chosen to study the crystallization and interaction of proteins with carbon **nanotubes**.
REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 14 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1998:262566 HCAPLUS
DOCUMENT NUMBER: 129:51350
TITLE: Specific interaction and two-dimensional crystallization of histidine tagged yeast RNA polymerase I on nickel-chelating lipids
AUTHOR(S): Bischler, Nicolas; **Balavoine, Fabrice**; Milkereit, Philipp; Tschochner, Herbert; **Mioskowski, Charles; Schultz, Patrick**
CORPORATE SOURCE: Institut de Genetique et de Biologie Moleculaire et Cellulaire, CNRS/INSERM/ULP 1, Illkirch, F-67404, Fr.
SOURCE: Biophysical Journal (1998), 74(3), 1522-1532
CODEN: BIOJAU; ISSN: 0006-3495
PUBLISHER: Biophysical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Nickel-chelating lipid monolayers were used to generate two-dimensional crystals from yeast RNA polymerase I that was histidine-tagged on one of its subunits. The interaction of the enzyme with the spread lipid layers was found to be imidazole dependent, and the formation of two-dimensional crystals required small amts. of imidazole, probably to select the specific interaction of the engineered tag with the nickel. Two distinct prepns. of RNA polymerase I tagged on different subunits yielded two different crystal forms, indicating that the position of the tag dets. the crystallization process. The orientation of the enzyme in both crystal forms is correlated with the location of the tagged subunits in a three-dimensional model which shows that the tagged subunits are in contact with the lipid layer.
REFERENCE COUNT: 39 THERE ARE 39 CITED REFERENCES AVAILABLE FOR THIS

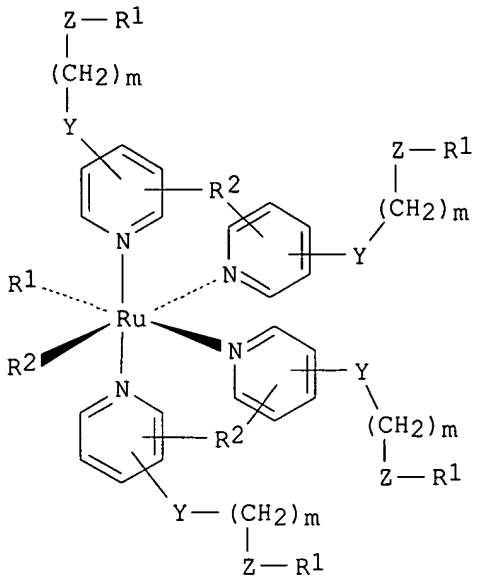
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 15 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1998:51274 HCAPLUS
DOCUMENT NUMBER: 128:240864
TITLE: Structural study of the response regulator HupR from Rhodobacter capsulatus. Electron microscopy of two-dimensional crystals on a nickel-chelating lipid
AUTHOR(S): Venien-Bryan, Catherine; **Balavoine, Fabrice**; Toussaint, Bertrand; **Mioskowski, Charles**; Hewat, Elizabeth A.; Helme, Brigitte; Vignais, Paulette M.
CORPORATE SOURCE: Institut de Biologie Structurale Jean-Pierre Ebel (CEA-CNRS), Grenoble, 38027, Fr.
SOURCE: Journal of Molecular Biology (1997), 274(5), 687-692
CODEN: JMOBAK; ISSN: 0022-2836
PUBLISHER: Academic Press Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Two-dimensional crystals of the histidine-tagged-HupR protein, a transcriptional regulator from the photosynthetic bacterium Rhodobacter capsulatus, were obtained upon specific interaction with a Ni2+-chelated lipid monolayer. HupR is a response regulator of the NtrC family; it activates the transcription of the structural genes, hupSLC, of the [NiFe]hydrogenase. The lipid (Ni-NTA-DOGA) uses the metal chelator nitrilotriacetic group as the hydrophilic headgroup and contains unsatd. oleyl tails to provide the fluidity necessary for two-dimensional protein crystallization A projection map of the full-length protein at 18 Å resolution was generated by analyzing electron microscopy micrographs of neg. stained crystals. The HupR protein appeared to be dimeric and revealed a characteristic propeller-like motif. Each monomer forms an L-shaped structure.
REFERENCE COUNT: 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 16 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1996:452319 HCAPLUS
DOCUMENT NUMBER: 125:103537
TITLE: Preparation of ruthenium bis{4,4'-bis[4-(4-benzoylbenzoyloxy)butoxycarbonyl]-2,2'-bipyridine} halides or carbonates and analogs for determination of protein topology
INVENTOR(S): **Balavoine, Fabrice**; Besse, Laurent; Lellouche, Jean Paul; **Mioskowski, Charles**
PATENT ASSIGNEE(S): Commissariat a l'Energie Atomique, Fr.
SOURCE: Fr. Demande, 32 pp.
CODEN: FRXXBL
DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2727415	A1	19960531	FR 1994-14359	19941130
PRIORITY APPLN. INFO.:			FR 1994-14359	19941130

OTHER SOURCE(S): MARPAT 125:103537
GI



I

AB Ruthenium(II) or ruthenium(III) complexes I are claimed such that the compound is comprised of a metal center capable of recognizing a peptide sequence containing at least one histidine, where X1, X2 = Cl, Br, I, or H2O, or X1X2 = CO3, and the other pyridine-containing ligands are comprised of Y = single bond, or various bivalent groups -C(O)O-, -C(O)NH-, O, S, CH2O, CH:CH, CH2S, CH2CH:CH, C.tplbond.C; Z = single bond, or bivalent group -OC(O)-, -NHC(O)-, O, S, OCH2, SCH2, CH:CH, C.tplbond.C; R1 = monovalent photosensitive group which presents an interaction with amino acids, such as benzophenone, a fluorescent group, luminescent group, complexing group, enzyme, avidine, biotin, fluorescent chromophore, light-absorbing chromophore, radiolabeled group, antibody, or antibody fragment; for m, 1 ≤ m ≤ 5; and R2 = (CH2)n, where 0 ≤ n ≤ 2, or comprises an o-phenanthroline with the pyridines. The ruthenium carbonate complexes are prepared by reaction of an appropriate ruthenium dichloride complex with Na2CO3. Thus, cis-dichlorobis(4,4'-bis[4-(4-benzoylbenzoyloxy)butoxycarbonyl]-2,2'-bipyridine)ruthenium(II) (Ru(L)2Cl2, preparation given) was reacted with excess Na2CO3 in Ar-degassed H2O to give cis-carbonatobis(4,4'-bis[4-(4-benzoylbenzoyloxy)butoxycarbonyl]-2,2'-bipyridine)ruthenium(II), (Ru(L)2CO3), in 95% yield. Reaction of Ru(L)2CO3 with Ala-His-Ala-Ala-Ala-His-Ala in pH 7 phosphate buffered solution, followed by addition of NH4PF6, afforded [Ru(L)2(peptide)](PF6)2 in 30-50% yield.

L8 ANSWER 17 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1996:172837 HCAPLUS
DOCUMENT NUMBER: 124:223843
TITLE: Specifically designed lipid assemblies as tools for two-dimensional crystallization of soluble biological macromolecules
AUTHOR(S): Lebeau, Luc; **Schultz, Patrick**; Celia, Herve; Mesini, Philippe; Nuss, Simone; Klinger, Corinne; Olland, Stephane; Oudet, Pierre; **Mioskowski**,

Charles
CORPORATE SOURCE: Laboratoire de Synthese Bio-Organique, Illkirch, Fr.
SOURCE: Handbook of Nonmedical Applications of Liposomes (1996), Volume 2, 153-86. Editor(s): Lasic, Danilo D.; Barenholz, Yechezkel. CRC: Boca Raton, Fla.
CODEN: 62NIA9
DOCUMENT TYPE: Conference; General Review
LANGUAGE: English
AB A review, with 164 refs. The authors report here specifically designed lipid assemblies as tools for two-dimensional crystallization of soluble biol. macromols.

L8 ANSWER 18 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1994:264484 HCAPLUS
DOCUMENT NUMBER: 120:264484
TITLE: Three-dimensional model of Escherichia coli gyrase B subunit crystallized in two-dimensions on novobiocin-linked phospholipid films
AUTHOR(S): Celia, Herve; Hoermann, Laurence; **Schultz, Patrick**; Lebeau, Luc; Mallouh, Veronique; Wigley, Dale B.; Wang, James C.; **Mioskowski, Charles**; Oudet, Pierre
CORPORATE SOURCE: Inst. Chim. Biol., Fac. Med., Strasbourg, 67085, Fr.
SOURCE: Journal of Molecular Biology (1994), 236(2), 618-28
CODEN: JMOBAK; ISSN: 0022-2836
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Two-dimensional crystals of the Escherichia coli DNA gyrase B subunit were obtained upon specific interactions with novobiocin-linked phospholipid films. A 3-dimensional surface model of the protein was generated by analyzing images of tilted neg. stained crystals. The structure showed, at 2.5 to 3.0 nm resolution, two elongated arms organized as a V-shaped protein: the bottom of the V contains the novobiocin binding site, and the extremities of the arms mediate protein-protein interactions between the two monomers in the unit cell. Image anal. of frozen hydrated two-dimensional crystals resulted in a 1.0 nm resolution projection map that shows structural elements not revealed with neg. staining. Electron microscopic structural data were compared with the crystallog. structure of the 43 kDa N-terminal fragment of the B subunit complexed with a non-hydrolysable ATP analog.

L8 ANSWER 19 OF 19 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1990:567969 HCAPLUS
DOCUMENT NUMBER: 113:167969
TITLE: Two-dimensional crystallization of DNA gyrase B subunit on specifically designed lipid monolayers
AUTHOR(S): Lebeau, L.; Regnier, E.; **Schultz, P.**; Wang, J. C.; **Mioskowski, C.**; Oudet, P.
CORPORATE SOURCE: Lab. Synth. Bio-Org., Fac. Pharm., Illkirch, 67401, Fr.
SOURCE: FEBS Letters (1990), 267(1), 38-42
CODEN: FEBLAL; ISSN: 0014-5793
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The B subunit of DNA gyrase formed 2-dimensional crystals when bound to a specifically recognized phospholipid spread into a monolayer at the air/water interface. The especially designed lipids consisted of novobiocin coupled through the 3' or 2'' hydroxyl group and a hydrophilic linker of a given length to dioleoylphosphatidic acid. Two-dimensional crystals of

the gyrase B subunit are formed under physiol. conditions of pH and ionic strength, with no precipitant added to the solution Crystal diffraction extended to a 2.7 nm resolution in neg. stain, with unit cell parameters a = 6.1 nm, b = 7.6 nm, and γ = 64°.